GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2024-2025

Aquatic Microbial Community Management (I002086)

Course size *(nominal values; actual values may depend on programme)*

Credits 3.0 **Study time 75 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 1)	English	Gent	lecture

Lecturers in academic year 2024-2025

Defoirdt, Tom	LA25	lecturer-in-charge

Offered in the following programmes in 2024-2025	**crdts**	**offering**
International Master of Science in Health Management in Aquaculture	3	A
International Master of Science in Marine Biological Resources	3	A
Master of Science in Aquaculture	3	A
Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)	3	A

Teaching languages

English

Keywords

Micro-organisms, communities, microbiota, microbiome, functionality, ecological selection, bio-floc technology.

Position of the course

The purpose of this course is to familiarize the students with the importance of the micro-organisms that are present in (the different compartments of) aquaculture systems, and how these can be managed. The students will learn that by the targeted manipulation of the microbiota in aquaculture systems, the disease risk for the cultured animals can considerably be decreased and production output can be increased.

Contents

Chapter 1 Microorganisms in aquaculture systems
1.1 Microorganisms and microbial communities
1.2 Methods to study microorganisms
1.3 Sources of microorganisms in aquaculture systems
1.4 Growth of microorganisms
1.5 Densities of microorganisms in aquaculture systems
1.6 Functions of microorganisms in aquaculture systems

Chapter 2 Removing bacteria
2.1 Physical inactivation
2.2 Disinfection
2.3 Antibiotics
2.4 Phage therapy
2.5 Managing the entrance of microorganisms

Chapter 3 Adding bacteria: probiotics
3.1 Probiotics in aquaculture
3.2 Modes of action
3.3 Selection of probiotics
3.4 Registration, production, delivery
3.5 The black box of probiotics
3.6 Prebiotics

Chapter 4 Analysis and steering of the microbial community

4.1 Aquaculture microbiomes
4.2 Analysis of diversity
4.3 Management based on diversity
4.4 r/K selection
4.5 Management based on r/K selection

Chapter 5 Bacterial activity management

5.1 Virulence factors
5.2 Inhibition of virulence factor production
5.3 Regulation of virulence factors
5.4 Quorum sensing (QS)
5.5 Quorum sensing interference (QSI)
5.6 Advantages of antivirulence therapy

Chapter 6 Biofloc technology

6.1 Waste generation in aquaculture
6.2 Removal of nitrogen waste
6.3 Manipulation of the C/N ratio
6.4 Aeration
6.5 Bioflocs as feed
6.6 Microbial ecology of bioflocs

Initial competences

General biology, chemistry, biochemistry and basic knowledge on aquaculture.

Final competences

1 The student is aware of the significance of the natural microbiota in aquaculture systems.

2 The student is able to describe and discuss the microbial compartments in aquaculture systems.
3 The student knows the methods that are available to study microorganisms and microbial communities.
4 The student is able to make funded suggestions and recommendations to improve the microbial community composition and functionality with the aim of maximizing animal health and culture performance.
5 The student knows the methods that can be used to manipulate the microbial community, and can approach this in both in a qualitative and quantitative way.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture

Extra information on the teaching methods

Theory lectures and calculation exercises: lectures based on powerpoint presentations.

Study material

Type: Slides

Name: Aquatic Microbial Community Management: lecture notes
Indicative price: € 10
Optional: yes
Language : English
Available on Ufora : Yes
Online Available : No
Available in the Library : No
Available through Student Association : No

References

Course content-related study coaching

Study guidance upon request by email or on appointment.

Assessment moments

end-of-term assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible

Extra information on the examination methods

Period aligned evaluation.
Theory: written closed book exam.
Calculations: written open book exam.

Calculation of the examination mark

Out of 20: 13 points attributed to closed book theory exam and 7 points attributed to open book calculations exam

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.